



Sustainable Storm Water Management Policies and Practices at Naval Installations

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**Environmental Energy Security & Sustainability
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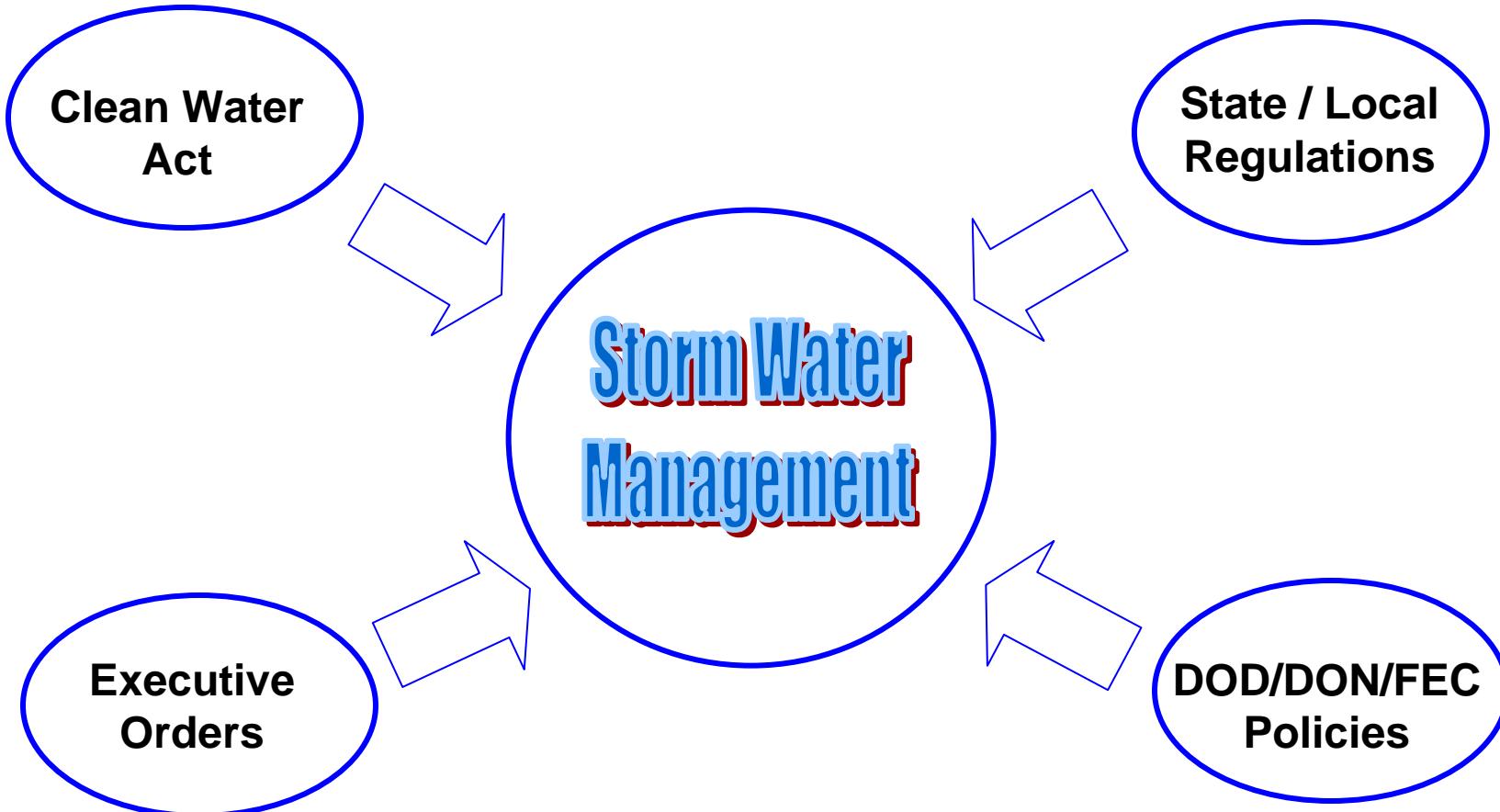
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Presentation Overview

- Summary of storm water management (SWM) regulations and policies
- Overview of current storm water management practices
- Outlook of LID applications in the future
- Overview of areas for further development

Storm Water Management Regulations / Policies



Applicable Storm Water Management Regulations



- Clean Water Act
 - Water quality standards
 - TMDL Rule; effluent standards
 - NPDES programs (treatment works direct/indirect discharges; storm water discharges)
 - Enforcement
- State and Local Storm Water Management Regulations
 - Equal to or more stringent than Federal standards
 - Permitting and enforcement authority

Most Naval installations are located in urbanized areas, subject to MS4 permitting

EISA of 2007 & Executive Orders



- **Energy Independence and Security Act (EISA) of 2007, Section 438 (Federal law)**
 - Applies to construction project with more than 5,000 square foot-print
 - Restores predevelopment/project hydrologic conditions (flow, volume, rate, and temperature) – mostly through low impact development (LID) technologies
- **EO 13423 (2007) Strengthening Federal Environmental, Energy, and Transportation Management**
 - Requires water consumption reduction (among other environmental-related requirements)
 - Implementation period: FY10 - FY15
- **EO 13514 (2009) Federal Leadership in Environmental, Energy, Economic Performance**
 - Enhances EO 13423 by extending implementation period (FY15 – FY30)
 - Enhances implementation of EISA Section 438 on storm water management
- **EO 13508 (2009) Chesapeake Bay Protection and Restoration**
 - Focuses on storm water management to restore Chesapeake Bay water quality
 - Implementation potentially serves as a model for other regions in the US

Main Policies Related to Storm Water Management



- Environmental Readiness Program Manual (5090.1C OPNAVINST, Oct. 2007)
 - Pollutant reduction or elimination (using low impact development designs)
 - Watershed management
 - Pretreatment program
- Nov. 2007 DON LID Policy for Storm Water Management
 - FY11 and beyond
 - \$750K new construction; \$5 Million renovation
 - Waiver option
 - Annual reporting
- Jan. 2010 DoD Policy for EISA Section 438 Implementation
 - Restoration of pre-development (pre-project) hydrologic conditions (temp, rate, volume, duration)
 - Use of TR-55 Method or 95th percentile storm data
 - Application of LID to the maximum extent technically feasible
 - Documentation of cost data and post-construction analysis as-built system effectiveness
- LID UFC 3-210-01 (being finalized)
- LEED Silver Certification
 - Control of peak storm water discharges and 90% avg annual rainfall
 - Regulation of peak discharge of 1yr/2yr storm events

A Historical Perspective on SWM Regulations and Policies



FOCUSSES

Pre-1990	1990	2000	Late 2000s	Beyond 2010
Point Source Discharge Regulations	Phase I MS4 storm water (non-point source) discharge regulations (> 5 ac)	Phase II MS4 storm water discharge regulations (1-5 ac) Low impact development approach	Sustainability regulations / policies: EISA 2007; OPNAVINST 5090.1C; DON LID Policy; EO 13423, 13514, 13508;	Sustainability implementation, including DoD Policy for EISA Sec. 438 Implementation
Flood, erosion control (70s)				
Water quality control (80s)				

Traditional vs. New Storm Water Management Approaches



• TRADITIONAL

- Pipe and pond centralized systems
- Remove storm water off-site
- Flood control, erosion control
- Inadequate water quality control
- Less environmental friendly

• LOW IMPACT DEVELOPMENT

- Localized systems
- Minimize runoff pollutants by holding, reusing, infiltrating storm water on site
- Expected to improve water quality control
- More environmental friendly

Existing traditional systems still needed to be maintained. Flood control still required by state and local agencies.



FY08-09 LID Applications

LID FEATURES	FY08	FY09
Grassed swales	19	12
Vegetated buffers/filter strips	5	7
Infiltration basins/trenches	2	3
Bioretention	4	
Tree box filters	1	
Soil amendments		3
Permeable pavers	3	2
Inlet poll. removal devices/dry wells	2	2
Vegetated roofs	1	
% of projects with LID features	25%	54%

Ref.: Annual LID Reports from NAVFAC HQ



LID Project Example - NSN

Existing Conditions at Site Z-312



Site Z-312 Completed Construction



After





LID Projects - NSN



Existing Conditions
at Site LP-33



Finished Conditions



LID Project Example - NSN



Unknown Utility





Example LID Projects - WNY





LID Project Example - Annapolis





LID Project Example - NSN





LID Project Example - WNY



Outlook of Storm Water Management Practices



- Navy LID Policy – LID included in for FY11 major construction/renovation projects
- DoD Policy for EISA Section 438 implementation expected in FY12 construction projects
- Storm water management part of multi-disciplinary efforts (planning, acquisition, design, construction, O&M, and asset management)
- A holistic approach - storm water management part of multi-purpose approached in sustainable development (related to water conservation/reuse/recycle, energy reduction, reduced carbon footprint, LEED certification, EMS, and compliance) while maintaining flood control conditions



Areas for Further Development

- Site Characterization and Planning

- Characterization of hydrologic conditions of regions and installations (e.g., through additional sampling and mathematical modeling)
- Comprehensive master planning using a holistic approach to achieve goals set by the DoD Policy for EISA Section 438 Implementation
- Development of better cost data

- Design and Construction

- Design facilities to meet applicable requirements in Federal, state, and local standards while achieving the goals set by the DoD Policy for EISA Sec. 438 Implementation and LID policies
- Expertise in applications of LID and new storm water treatment technologies in meeting water quality standards and demonstrating sustainability practices
- Improved QA/QC in construction of LID facilities



Areas for Further Development

- Operation & Maintenance
 - Operation and maintenance of LID facilities
 - System monitoring, inspection, testing, and evaluation
 - Generation of life-cycle cost data for LID facilities and storm water systems



QUESTIONS?

